UNIVERSITY OF HAWAII
LIBRARY
FEB 25 8 18 AM '70

Journal of MOLECULAR BIOLOGY

LIBRARY USE ONLY

EDITOR-IN-CHIEF
J. C. KENDREW

ASSISTANT EDITOR
S. BRENNER

EDITORIAL BOARD
G. Attardi
S. Bernhard
J. E. Darnell
G. von Ehrenstein
G. Felsenfeld
J. Hurwitz
H. E. Huxley
A. D. Kaiser
A. Klug
O. Maaløe
A. Novick
G. E. Palade
D. C. Phillips
L. Stryer
C. Thomas
A. Tissières
J. Wyman

VOLUME 44
28 August 1969 to 28 September 1969

ACADEMIC PRESS
LONDON and NEW YORK

301
3

Copyright © 1969, by Academic Press Inc. (London) Ltd.

ALL RIGHTS RESERVED

No part of this volume may be reproduced in any form, by photostat, microfilm, or any other means, without written permission from the publishers.

Printed in Great Britain

CONTENTS OF VOLUME 44

Number 1, 28 August 1969

Yaniv, M. and Gros, F., Studies on Valyl-tRNA Synthetase and $tRNA^{Val}$ from *Escherichia coli*. I. Purification and Properties of the Enzyme from Normal *Escherichia coli* Strains 1

Yaniv, M. and Gros, F., Studies on Valyl-tRNA Synthetase and $tRNA^{Val}$ from *Escherichia coli*. II. Interaction between Valyl-tRNA Synthetase and Valine Acceptor tRNA 17

Yaniv, M. and Gros, F., Studies on Valyl-tRNA Synthetase and $tRNA^{Val}$ from *Escherichia coli*. III. Valyl-tRNA Synthetases from Thermosensitive Mutants of *Escherichia coli* 31

Attardi, B., Cravioto, B. and Attardi, G., Membrane-bound Ribosomes in HeLa Cells. I. Their Proportion to Total Cell Ribosomes and their Association with Messenger RNA 47

Badley, R. A. and Teale, F. W. J., Resonance Energy Transfer in Pepsin Conjugates 71

Appendix—Energy Transfer from an Array of Rapidly Rotating or Stationary Dipoles to One Acceptor Dipole 84

Hill, W. E., Thompson, J. D. and Anderegg, J. W., X-ray Scattering Study of Ribosomes from *Escherichia coli* 89

Fangman, W. L. and Feiss, M., Fate of λ DNA in a Bacterial Host Defective in DNA Synthesis 103

Gottesman, S. and Beckwith, J. R., Directed Transposition of the Arabinose Operon: A Technique for the Isolation of Specialized Transducing Bacteriophages for any *Escherichia coli* Gene 117

Cohen, G. H., Silverton, E. W., Matthews, B. W., Braxton, H. and Davies, D. R., Structure of γ-Chymotrypsin at 5·5 Å Resolution . . 129

Schmid, C. W. and Hearst, J. E., Molecular Weights of Homogeneous Coliphage DNA's from Density-gradient Sedimentation Equilibrium . . 143

Nordwig, A. and Hayduk, U., Invertebrate Collagens: Isolation, Characterization and Phylogenetic Aspects 161

Lanni, Y. T., Functions of Two Genes in the First-step-transfer DNA of Bacteriophage T5 173

Morse, D. E. and Yanofsky, C., Amber Mutants of the *trpR* Regulatory Gene 185

Zylber, E., Vesco, C. and Penman, S., Selective Inhibition of the Synthesis of Mitochondria-associated RNA by Ethidium Bromide 195

Letters to the Editor

Budowsky, E. I., Sverdlov, E. D. and Monastyrskaya, G. S., Mechanism of Mutagenic Action of Hydroxylamine. II. Reaction of Hydroxylamine with the Adenine Nucleus 205

Schairer, H. U. and Overath, P., Lipids containing *trans*-unsaturated Fatty Acids change the Temperature Characteristic of Thiomethylgalactoside Accumulation in *Escherichia coli* 209

Announcement 215

Number 2, 14 September 1969

Lark, K. G., Role of Deoxynucleotide Strand Age or Polarity in determining Asymmetric Chromosome Replication after Thymine Starvation of *Escherichia coli* 15T⁻ 217

Murray, R. E. and Mathews, C. K., Addition of Nucleotides to Parental DNA Early in Infection by Bacteriophage T4 233

Murray, R. E. and Mathews, C. K., Biochemistry of DNA-defective Amber Mutants of Bacteriophage T4. II. Intracellular DNA Forms in Infection by Gene *44* Mutants 249

Hill, W. E., Rossetti, G. P. and Van Holde, K. E., Physical Studies of Ribosomes from *Escherichia coli* 263

Katz, L., Proton Magnetic Resonance Investigation of the Association of Adenine and Uracil Derivatives in Chloroform Solution 279

Herzberg, M., Lelong, J. C. and Revel, M., Purification of Initiator C from *Escherichia coli*: a Protein which Binds Messenger RNA and Initiator tRNA to the 30 s Ribosome 297

Tawada, K. and Oosawa, F., Activation of H-Meromyosin ATPase by Polymers of Actin and Carboxymethylated Actin 309

Nakaoka, Y. and Kasai, M., Behaviour of Sonicated Actin Polymers: Adenosine Triphosphate Splitting and Polymerization 319

Aloni, Y., Winocour, E., Sachs, L. and Torten, J., Hybridization between SV40 DNA and Cellular DNA's 333

MAO, J. C.-H. and PUTTERMAN, M., The Intermolecular Complex of Erythromycin and Ribosome 347

ROSEN, B., ROTHMAN, F. and WEIGERT, M. G., Miscoding caused by 5-Fluorouracil 363

NUMBER 3, 28 SEPTEMBER 1969

BURGESS, A. B. and DENHARDT, D. T., Studies on ϕX174 Proteins. I. Phage-specific Proteins Synthesized after Infection of *Escherichia coli* . . 377

ROWND, R., Replication of a Bacterial Episome under Relaxed Control . . 387

Appendix—Theoretical Distribution of Light, Hybrid and Heavy R-factor DNA during the First Generation in ^{15}N-labeled Medium according to the Random Model of Episome Replication . . . 400

GARTLAND, W. J., ISHIDA, T., SUEOKA, N. and NIRENBERG, M. W., Coding Properties of Two Conformations of Tryptophanyl-tRNA in *Escherichia coli* 403

SEDAT, J., LYON, A. and SINSHEIMER, R. L., Purification of *Escherichia coli* Pulse-labeled RNA by Benzoylated DEAE-cellulose Chromatography . 415

SCHALLER, H., Structure of the DNA of Bacteriophage fd. I. Absence of Non-phosphodiester Linkages 435

SCHALLER, H., VOSS, H. and GUCKER, S., Structure of the DNA of Bacteriophage fd. II. Isolation and Characterization of a DNA Fraction with Double Strand-like Properties 445

KELLY, T. J., Jr and THOMAS, C. A., Jr, An Intermediate in the Replication of Bacteriophage T7 DNA Molecules 459

ROTHFIELD, L. and PEARLMAN-KOTHENCZ, M., Synthesis and Assembly of Bacterial Membrane Components. A Lipopolysaccharide–Phospholipid–Protein Complex Excreted by Living Bacteria 477

WANG, A-C. and FUDENBERG, H. H., Genetic Control of Gamma Chain Synthesis: A Chemical and Evolutionary Study of the Gm(a) Factor of Immunoglobulins 493

GELFAND, D. H. and HAYASHI, M., Electrophoretic Characterization of ϕX174-specific Proteins 501

EGYHÁZI, E., DANEHOLT, B., EDSTRÖM, J.-E., LAMBERT, B. and RINGBORG, U., Low Molecular Weight RNA in Cell Components of *Chironomus tentans* Salivary Glands. 517

INMAN, R. B. and BERTANI, G., Heat Denaturation of P2 Bacteriophage DNA: Compositional Heterogeneity 533

Soeiro, R. and Darnell, J. E., Competition Hybridization by "Pre-saturation" of HeLa Cell DNA 551

Letters to the Editor—

Brunori, M., Antonini, E., Phelps, C. and Amiconi, G., Rates of Reaction with Ligands of Haemoproteins reconstituted with Unnatural Haems 563

Camerman, N., Hofmann, T., Jones, S. and Nyburg, S. C., A Crystalline Proteinase (Peptidase A) from *Penicillium janthinellum*: Preliminary X-ray Data 569

Erratum 571

Index to Volume 44

Actin and carboxymethylated actin polymers, activation of H-meromyosin ATPase, 309
— polymers, sonicated, ATP splitting and polymerization, 319
Adenine and uracil derivatives in chloroform solution, association investigated by proton magnetic resonance, 279
— nucleus, reaction with hydroxylamine, 205
Adenosine triphosphatase of H-meromyosin, activation by polymers of actin and carboxymethylated actin, 309
— triphosphate splitting and polymerization by sonicated actin polymers, 319
Aloni, Y., Winocour, E., Sachs, L. & Torten, J., Base sequence homology between DNA from simian virus 40 and cellular DNA, 333
Amber mutants of the *trpR* regulatory gene, 185
Amiconi, G. (see also Brunori, M.), 563
Anderegg, J. W. (see also Hill, W. E.), 89
Antonini, E. (see also Brunori, M.), 563
Arabinose operon in *Escherichia coli*, directed transposition, 117
Attardi, B., Cravioto, B. & Attardi, G., Membrane-bound ribosomes in HeLa cells. I. Their proportion to total cell ribosomes and their association with messenger RNA, 47
Attardi, G. (see also Attardi, B.), 47

Bacterial episome replication under relaxed control, 387
— membrane components, synthesis and assembly from a lipopolysaccharide–phospholipid–protein complex excreted by living bacteria, 477
Bacteriophage fd DNA, isolation and characterization of a fraction with double strand-like properties, 445
— — — structure, absence of non-phophodiester linkages, 435
— λ DNA, fate in a bacterial host defective in DNA synthesis, 103
— φX174-specific proteins, electrophoretic characterization, 501
— — — — synthesized after infection of *Escherichia coli*, 377
— P2 DNA denatured by heat, compositional heterogeneity, 533
—, technique for the isolation of specialized transducing bacteriophages for any *Escherichia coli* gene, 117
— T4, addition of nucleotides to parental DNA early in infection, 233
— —, intracellular DNA forms in infection by gene 44 mutants, 249
— T5, functions of two genes in the first-step-transfer DNA, 173
— T7, an intermediate in the replication of DNA molecules, 459
Badley, R. A. & Teale, F. W. J., *Appendix*–Energy transfer from an array of rapidly rotating or stationary dipoles to one acceptor dipole, 84
— & —, Resonance energy transfer in pepsin conjugates, 71
Beckwith, J. R. (see also Gottesman, S.), 117
Benzoylated DEAE-cellulose chromatography, purification of *Escherichia coli* pulse-labeled RNA, 415
Bertani, G. (see also Inman, R. B.), 533
Braxton, H. (see also Cohen, G. H.), 129
Brunori, M., Antonini, E., Phelps, C. & Amiconi, G., Rates of reaction with ligands of haemoproteins reconstituted with unnatural haems, 563
Budowsky, E. I., Sverdlov, E. D. & Monastyrskaya, G. S., Mechanism of mutagenic action of hydroxylamine. II. Reaction of hydroxylamine with the adenine nucleus, 205
Burgess, A. B. & Denhardt, D. T., Studies on φX174 proteins. I. Bacteriophage-specific proteins synthesized after infection of *Escherichia coli*, 377

Camerman, N., Hofmann, T., Jones, S. & Nyburg, S. C., A crystalline proteinase (peptidase A) from *Penicillium janthinellum:* preliminary X-ray data, 569
Carboxymethylated actin and actin polymers, activation of H-meromyosin ATPase, 309
Chironomus tentans, low molecular weight RNA in cell components of salivary glands, 517

Chromatography, benzoylated DEAE-cellulose, purification of *Escherichia coli* pulse-labelled RNA, 415
Chromosome replication, role of deoxynucleotide strand age or polarity in determining assymetric replication after thymine starvation of *Escherichia coli* 15T⁻, 217
γ-Chymotrypsin, structure at 5·5 Å resolution, 129
Cohen, G. H., Silverton, E. W., Matthews, B. W., Braxton, H. & Davies, D. R., Structure of γ-chymotrypsin at 5·5 Å resolution, 129
Coliphage DNA's, homogeneous, molecular weights from density gradient sedimentation equilibrium, 143
Collagens, invertebrate, isolation, characterization and phylogenetic aspects, 161
Cravioto, B. (see also Attardi, B.), 47

Daneholt, D. (see also Eghyazi, E.), 517
Darnell, J. E. (see also Soeiro, R.), 551
Davies, D. R. (see also Cohen, G. H.), 129
Denhardt, D. T. (see also Burgess, A. B.), 377
Density gradient sedimentation equilibrium, molecular weights of homogeneous coliphage DNA's, 143
Deoxynucleotide, role of strand age or polarity in determining assymetric chromosome replication after thymine starvation of *Escherichia coli* 15T⁻, 217
Deoxyribonucleic acid, an intermediate in the replication of T7 DNA molecules, 459
— —, base sequence homology between cellular DNA and simian virus 40 DNA, 333
— —, compositional heterogeneity of P2 bacteriophage DNA denatured by heat, 533
— —, functions of two genes in the first-step-transfer DNA of bacteriophage T5, 173
— —, intracellular forms in infection by gene 44 mutants in bacteriophage T4, 249
— — of bacteriophage fd, absence of non-phosphodiester linkages, 435
— — — — —, isolation and characterization of a DNA fraction with double strand-like properties, 445
— — — — lambda, fate in a bacterial host defective in DNA synthesis, 103
— — — — HeLa cells, competition hybridization by "presaturation", 551
— —, parental, addition of nucleotides early in infection by bacteriophage T4, 233
— acids, homogeneous, molecular weights of coliphage DNA's from density gradient sedimentation equilibrium, 143

Edström, J.-E. (see also Egyházi, E.), 517
Egyházi, E., Daneholt, D., Edström, J.-E., Lambert, B. & Ringborg, U., Low molecular weight RNA in cell components of *Chironomus tentans* salivary glands, 517
Electrophoretic characterization of φX174-specific proteins, 501
Episome, bacterial, replication under relaxed control, 387
Erythromycin and ribosome, the intermolecular complex, 347
Escherichia coli, amber mutants of the *trpR* regulatory gene, 185
— —, bacteriophage φX174-specific proteins synthesized after infection, 377
— —, coding properties of two conformations of tryptophanyl-tRNA, 403
— — 15T⁻, role of deoxynucleotide strand age or polarity in determining asymmetric chromosome replication after thymine starvation, 217
— —, technique for the isolation of specialized transducing bacteriophages for any gene, 117
— — mRNA and initiator tRNA bound to the 30 s ribosome by a protein, 297
— —, physical studies on ribosomes, 263
— — pulse-labeled RNA, purification by benzoylated DEAE-cellulose chromatography, 415
— —, temperature characteristic of thiomethylgalactoside accumulation changed by lipids containing trans-unsaturated fatty acids, 209
— — valyl-tRNA synthetase and $tRNA^{val}$, purification and properties, 1
— — valyl-tRNA synthetase, interaction with valine acceptor tRNA, 17
— — —-— synthetases from thermosensitive mutants, 31
— —, X-ray scattering study of ribosomes, 89
Ethidium bromide, selective inhibition of the synthesis of mitochondria-associated RNA, 195
Evolutionary study of the GM(a) factor of immunoglobulins, 493
fd (see Bacteriophage)
Fangman, W. L. & Feiss, M., Fate of λ DNA in a bacterial host defective in DNA synthesis, 103
Feiss, M. (see also Fangman, W. L.), 103

5-Fluorouracil miscoding, 363
Fudenberg, H. H. (see also Wang, A. C.), 493

Gm(a) (see Immunoglobulin) 493
Gartland, W. J., Ishida, T., Sueoka, N. & Nirenberg, M., Coding properties of two conformations of tryptophanyl-tRNA in *Escherichia coli*, 403
Gelfand, D. H. & Hayashi, M., Electrophoretic characterization of ϕX174-specific proteins, 501
Gottesman, S. & Beckwith, J. R., Directed transposition of the arabinose operon: A technique for the isolation of specialised transducing bacteriophages for any *Escherichia coli* gene, 117
Gros, F. (see also Yaniv, M.). 1, 17, 31
Gucker, S. (see also Schaller, H.), 445

Haemoproteins reconstituted with unnatural haems, rates of reaction with ligands, 563
Hayashi, M. (see also Gelfand, D. H.), 501
Hayduk, U. (see also Nordwig, A.), 161
Hearst, J. E. (see also Schmid, C. W.), 143
HeLa cell DNA, competition hybridization by "presaturation", 551
— — ribosomes, the proportion of membrane-bound to total cell ribosomes and their association with messenger RNA, 47
Herzberg, M., Lelong, J. C. & Revel, M., Purification of initiator C from *Escherichia coli:* a protein which binds messenger RNA and initiator tRNA to the 30 s ribosome, 297
Hill, W. E., Rossetti, G. P. & Van Holde, K. E., Physical studies of ribosomes from *Escherichia coli*, 263
—, Thompson, J. D. & Anderegg, J. W., X-ray scattering study of ribosomes from *Escherichia coli*, 89
Hofmann, T. (see also Camerman, N.), 569
Hydroxylamine, reaction with the adenine nucleus, 205

Immunoglobulins, chemical and evolutionary study of the Gm(a) factor, 493
Inman, R. B. & Bertani, G. Heat denaturation of P2 bacteriophage DNA: Compositional heterogeneity, 533
Invertebrate collagens, isolation, characterization and phylogenetic aspects, 161
Ishida, T. (see also Gartland, W. J.), 403

Jones, S. (see also Camerman, N.), 569

Kasai, M. (see also Nakaoka, Y.), 319
Katz, L., Proton magnetic resonance investigation of the association of adenine and uracil derivatives in chloroform solution, 279
Kelly, T. J. & Thomas, C. A., An intermediate in the replication of T7 DNA molecules, 459

λ (see Bacteriophage)
Lambert, B. (see also Egyházi, E.), 517
Lanni, Y. T., Functions of two genes in the first-step-transfer DNA of bacteriophage T5, 173
Lark, K. G., Role of deoxynucleotide strand age or polarity in determining assymetric chromosome replication after thymine starvation of *Escherichia coli* 15T$^-$, 217
Lelong, J. C. (see also Herzberg, M.), 297
Lipids containing *trans*-unsaturated fatty acids change the temperature characteristic of thiomethylgalactoside accumulation in *Escherichia coli*, 209
Lipopolysaccharide–phospholipid–protein complex, synthesis and assembly of bacterial membrane components from complex excreted by living bacteria, 477
Lyon, A. (see also Sedat, J.), 415

Mao, J. C.-H. & Putterman, M., The intermolecular complex of erythromycin and ribosome, 347
Mathews, C. K. (see also Murray, R. E.), 233, 249
Matthews, B. W. (see also Cohen, G. H.), 129

Membrane components of bacteria, synthesis and assembly from lipopolysaccharide–phospholipid–protein complex excreted by living bacteria, 477
H-Meromyosin ATPase, activation by polymers of actin and carboxymethylated actin, 309
Messenger RNA and initiator tRNA bound to the 30 s ribosome by a protein in *Escherichia coli*, 297
— —, association with membrane-bound ribosomes in HeLa cells, 47
Miscoding caused by 5-fluorouracil, 363
Mitochondria-associated RNA synthesis selectively inhibited by ethidium bromide, 195
Monastyrskaya, G. S. (see also Budowsky, E. I.), 205
Morse, D. E. & Yanofsky, C., Amber mutants of the *trpR* regulatory gene, 185
Murray, R. E. & Mathews, C. K., Addition of nucleotides to parental DNA early in infection by bacteriophage T4, 233
— & —, Biochemistry of DNA-defective amber mutants of bacteriophage T4. II. Intracellular DNA forms in infection by gene *44* mutants, 249
Mutagenic action of hydroxylamine and reaction with the adenine nucleus, 205

Nakaoka, Y. & Kasai, M., On the behaviour of sonicated actin polymers—ATP splitting and polymerization, 319
Nirenberg, M. (see also Gartland, W. J.), 403
Nordwig, A. & Hayduk, U., Invertebrate collagens: isolation, characterization and phylogenetic aspects, 161
Nyburg, S. C. (see also Camerman, N.), 569

Oosawa, F. (see also Tawada, K.), 309
Overath, P. (see also Schairer, H. U.), 209

ϕX174 (see Bacteriophage)
P2 (see Bacteriophage), 533
Pearlman-Kothenez, M. (see also Rothfield, L.), 477
Penicillium janthinellum, X-ray data for a crystalline proteinase, peptidase A, 569
Penman, S. (see also Zylber, E.), 195
Pepsin conjugates, resonance energy transfer, 71
Peptidase A. a crystalline proteinase from *Penicillium janthinellum*, preliminary X-ray data, 569
Phelps, C. (see also Brunori, M.), 563
Phylogenetic aspects of invertebrate collagens, 161
Polymers of actin, sonicated, ATP splitting and polymerization, 319
Proton magnetic resonance investigation of the association of adenine and uracil derivatives in chloroform solution, 279
Putterman, M. (see also Mao, J. C.-H.), 347

Replication of a bacterial episome under relaxed control, 387
Resonance energy transfer in pepsin conjugates, 71
Revel, M. (see also Herzberg, M.), 297
Ribonucleic acid associated with mitochondria, selective inhibition of synthesis by ethidium bromide, 195
— —, messenger, and initiator tRNA bound to the 30 s ribosome by a protein in *Escherichia coli*, 297
— —, messenger, association with membrane-bound ribosomes in HeLa cells, 47
— — of low molecular weight in cell components of *Chironomus tentans* salivary glands, 517
— —, pulse-labeled, from *Escherichia coli*, purification by benzoylated DEAE-cellulose chromatography, 415
— —, tryptophanyl-transfer, coding properties of two conformations in *Escherichia coli*, 403
— —, valyl-tRNA synthetases from thermosensitive mutants of *Escherichia coli*, 31
— —, valyl transfer synthetase and $tRNA^{val}$ from *Escherichia coli*, purification and properties, 1
— —, — — —, interaction with valine acceptor tRNA from *Escherichia coli*, 17
Ribosome and erythromycin, the intermolecular complex, 347
Ribosomes from *Escherichia coli*, physical studies, 263
— — *Escherichia coli*, X-ray scattering study, 89
— of HeLa cells, the proportion of membrane-bound to total cell ribosomes and their association with messenger RNA, 47
Ringborg, U. (see also Egyházi, E.), 517
Rosen, B., Rothman, F. & Weigert, M. G., Miscoding caused by 5-fluorouracil, 363

Rossetti, G. P. (see also Hill, W. E.), 263
Rothfield, L. & Pearlman-Kothenez, M., Synthesis and assembly of bacterial membrane components from a lipopolysaccharide–phospholipid–protein complex excreted by living bacteria, 477
Rothman, F. (see also Rosen, B.), 363
Rownd, R. H., *Appendix.*—Theoretical distribution of light, hybrid and heavy R-factor DNA during the first generation in ^{15}N-labeled medium according to the random model of episome replication, 400
—, Replication of a bacterial episome under relaxed control, 387

Sachs, L. (see also Aloni, Y.), 333
Salivary gland cell components of *Chironomus tentans*, low molecular weight RNA, 517
Schairer, H. U. & Overath, P., Lipids containing *trans*-unsaturated fatty acids change the temperature characteristic of thiomethylgalactoside accumulation in *Escherichia coli*, 209
Schaller, H., Structure of the DNA of bacteriophage fd. I. Absence of non-phosphodiester linkages, 435
—, Voss, H. & Gucker, S., Structure of the DNA of bacteriophage fd II. Isolation and characterization of a DNA fraction with double strand-like properties, 445
Schmid, C. W. & Hearst, J. E., Molecular weights of homogeneous coliphage DNA's from density gradient sedimentation equilibrium, 143
Sedat, J., Lyon, A. & Sinsheimer, R. L., Purification of *Escherichia coli* pulse-labeled RNA by benzoylated DEAE-cellulose chromatography, 415
Silverton, E. W. (see also Cohen, G. H.), 129
Simian virus 40 DNA and cellular DNA, base sequence homology, 333
Sinsheimer, R. L. (see also Sedat, J.), 415
Soeiro, R. & Darnell, J. E., Competition hybridization by "presaturation" of HeLa cell DNA, 551
Sueoka, N. (see also Gartland, W. J.), 403
Sverdlov, E. D. (see also Budowsky, E. I.), 205

T4 (see Bacteriophage)
T5 (see Bacteriophage)
T7 (see Bacteriophage)
Tawada, K. & Oosawa, F., Activation of H-meromyosin ATPase by polymers of actin and carboxymethylated actin, 309
Teale, F. W. J. (see also Badley, R. A.), 71, 84
Thiomethylgalactoside accumulation in *Escherichia coli*, lipids containing *trans*-unsaturated fatty acids change the temperature characteristic of this reaction, 209
Thomas, C. A. (see also Kelly, T. J.), 459
Thompson, J. D. (see also Hill, W. E.), 89
Thymine starvation of *Escherichia coli* 15T$^-$, role of deoxynucleotide strand age or polarity in determining asymmetric chromosome replication after starvation, 217
Torten, J. (see also Aloni, Y.), 333
Transfer RNA, initiator, and mRNA bound to the 30 s ribosome by a protein in *Escherichia coli*, 297
— — synthetase, valyl, and $tRNA^{val}$ from *Escherichia coli*, purification and properties, 1
— — — —, interaction with valine acceptor tRNA from *Escherichia coli*, 17
— — synthetases, valyl from thermosensitive mutants of *Escherichia coli*, 31
— —, tryptophanyl, coding properties for two conformations in *Escherichia coli*, 403
Tryptophan regulatory gene mutants, amber, in *Escherichia coli*, 185
Tryptophanyl-tRNA, coding properties of two conformations in *Escherichia coli*, 403

Uracil and adenine derivatives in chloroform solution, association investigated by proton magnetic resonance, 279

Valyl-transfer RNA synthetase and $tRNA^{val}$ from *Escherichia coli*, purification and properties, 1
—-— — — thermosensitive mutants of *Escherichia coli*, 31
—-— — — interaction with valine acceptor tRNA from *Escherichia coli*, 17
Van Holde, K. E. (see also Hill, W. E.), 263
Vesco, C. (see also Zylber, E.), 195
Voss, H. (see also Schaller, H.), 445

Wang, A. C. & Fudenberg, H. H., Genetic control of λ chain synthesis: a chemical and evolutionary study of the Gm(a) factor of immunoglobulins, 493
Weigert, M. G. (see also Rosen, B.), 363
Winocour, E. (see also Aloni, Y.), 333

X-ray data for a crystalline proteinase peptidase A, from *Penicillium janthinellum*, 569
— scattering study of ribosomes from *Escherichia coli*, 89

Yaniv, M. & Gros, F., Studies on valyl-tRNA synthetase and $tRNA^{val}$ from *Escherichia coli*. II. Interaction between valyl-tRNA synthetase and valine acceptor tRNA, 17
— & —, — — —. I. Purification and properties of the enzyme from normal *Escherichia coli* strains, 1
— &, —, — — —. III. Valyl-tRNA synthetases from thermosensitive mutants of *Escherichia coli*, 31
Yanofsky, C. (see also Morse, D. E.), 185

Zylber, E., Vosco, C. & Penman, S., Selective inhibition of the synthesis of mitochondria-associated RNA by ethidium bromide, 195